Spatial Thinking and Geotechnologies Workshop: Cherry Creek School District – 31 Jan – 1 Feb 2017

Summary:
Two-day workshop led by an Esri education manager and geographer on integrating spatial thinking and geotechnologies (GPS, remote sensing, Geographic Information Systems (GIS)) into Cherry Creek School District curricula, with a focus on geography, history, and STEM. Content will include investigations in: Local to global population change and demographics; mapping trees and other physical objects on campus; natural hazards, weather, climate, and ecoregions; spatial analysis in mapping human health and disease; using, symbolizing, classifying, saving, and sharing web maps; creating multimedia web-based story maps and other web mapping applications.

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http://blogs.esri.com/blogs/gisedcom and http://geonet.esri.com and about spatial data on
http://spatialreserves.wordpress.com and 3,000 videos on http://www.youtube.com/geographyuberalles.

Course Goals:
1. Develop **knowledge and skills** in geotechnologies: GIS, remote sensing, and GPS, including technical skills and the foundational underpinnings, as well as pertinent issues surrounding geotechnologies, including analytics, cloud, data sources, data formats, multimedia maps, data quality; map projections, symbolizing, georeferencing, measurement, classification, databases, smartphone-to-map workflows, publishing data and maps, and spatial statistics.
2. Develop **teaching skills** with the spatial perspective and geotechnologies that foster critical thinking and problem-based learning in different knowledge domains and subjects.
3. Develop **confidence** that you can use these skills and perspectives to move forward with **your own** instruction.

Course Philosophy:
1. This is **your** course. Let me know how we can help you today and in the future as you use geotechnologies.
2. It is important that you **network** with your colleagues.
3. Using geotechnologies effectively is a journey.
4. We will not work with every tool but we will build a foundation so that you will be empowered and confident.
5. We will not have time to complete each exercise, but you can go through each of exercise on your own.
6. The activities for the workshop include core themes and skills that can be used in many disciplinary areas.

Agenda: Day 1
- Introductions. What is GIS video: http://video.esri.com/watch/3623/what-is-gis_question_
- Introductions and Goals. Why mapping? Give short presentation and discuss topics raised and also demonstrate ArcGIS Online presentation mode. Demonstrate: paper vs. digital maps; maps as reference documents vs. maps as investigative tools; table of data vs. a map of that same data.
- Fill out your own data in Crowdsource Story Map (view out your window) (http://arcg.is/2kkdpF0) and data about you in ArcGIS Online: http://arcg.is/20ZTd7Z and discuss: What is crowdsourcing? What are geotechnologies, how do geotechnologies (GIS, GPS, remote sensing, web mapping) work, cloud vs. desktop tools, data quality, scale, map projections, metadata.
- What is my role and what is Esri? http://www.esri.com/about-esri#what-we-do
- Penn State Geospatial Revolution: Trailer video. Penn State. And - Why Get Excited about Web Maps? https://www.youtube.com/watch?v=8WpxgVJXwbk -- Why geotechnologies matter in society and in education.

- Discuss: How are geotechnologies used in society? How are they evolving? How is GIS becoming a platform? What career opportunities exist? US Dept of Labor report. What is GIS? What is ArcGIS?
- Investigation 1: 5 short activities using 5 relevant web maps: (1) Zika Virus 1947-2016. (2) Spratly Islands Fiery Cross Reef and Hughes Reef. (3) Syrian refugees. (4) Seasonal Changes in Snow Cover. (5) Mapping Starbucks.
- Investigation 2: The 13 Colonies GeoInquiry. ConnectEd and GeoInquiries.
- Discuss: ArcGIS Online use: (0) Anonymous. (1) Public, (2) Developer; (3) Organizational subscription.
- Investigation 3: Colorado Precipitation Activity. Part of the Colorado Digital Atlas: http://education.maps.arcgis.com/apps/PublicGallery/index.html?appid=bede0ef880d0411eaac9b0af4c1eb5be
- Investigation 4: National – to-local investigation: Demographics of the USA. Focus on: Denver Metro. Median age, median income, population change, diversity, tapestry (lifestyle).
- Investigation 5: Historical investigation of Aurora. Using historical USGS topographic maps.
- Investigation 6: The Basics: Log in to your ArcGIS Online account. Add World Hydro and Ecoregions of the World. Create bookmarks. Zoom to Colorado. Save and share maps.
- Investigation 7: Investigating storymaps. Show gallery.
- Investigation 8: Collect and map data on CCSD campus grounds.
  Discuss: Methods of collecting data. How GPS works; GPS accuracy; smartphone tools and accuracy; coordinate systems and formats.
- **Outside**: Collect data with smartphones using 3 methods: (1) Take photo and record data (vegetation type and height) on phone or clipboard. (2) Snap2Map. Take pictures, create storymap of vegetation.
- Web browser: https://survey123.arcgis.com/share/ee44acb2cd5b4c11925063afddfc33c9
  Field app: arcgis-survey123://?itemID=ee44acb2cd5b4c11925063afddfc33c9
  Examine map.
- **Evaluation;** final Q&A. Critical Incident Questionnaire. https://goo.gl/forms/NzqbdPzhkDnsUhRy1

Day 2

- Show St Vrain students' storymaps.
  Show Hans B's Montana student storymaps: http://bhsgis.weebly.com/web-maps-lessons-sponsors.html
- Show student work in River Journey Project: http://rea-river-journey.blogspot.com/p/student-story-maps.html
- Investigation 9: Examine ecoregions, population density, and imagery. Create a map presentation based on this map.
- Investigation 10: Examine global plate tectonics: Plate bdys, vol, earthquakes. Map last 7 days of earthquakes.
- Investigation 11: Create a new multimedia map: On laptop/tablet: Start new map: Create Map Notes. Discuss multimedia in maps. Manually add locations at which data was collected in the field. Add photographs to notes. Classify, symbolize. Save and share map. Discuss: Maps vs apps vs story maps.
- Investigation 12: Hydro activity: Watersheds, rivers, trace downstream.
- Your thoughts about integrating GIS in the classroom. Independent worktime or in teams. Report out about challenges and plans.
- Investigation 13: Map data from a spreadsheet: Save and share. Investigate spatial patterns of businesses in a metropolitan area. Classify it. Symbolize (style) it. Then, map your OWN spreadsheet data.
- Investigation 14: Use Survey123 to collect vegetation data.
- Investigation 15: Modify story map: Video, GPX track, embedding. Examine additional story maps (audio, etc.)
- Investigation 16: Examine food expenditures, at home vs away from home. Math integration.
- Investigation 17: Analyzing cholera data. http://arcg.is/2kkLDIg using the analysis tools in ArcGIS Online.
- Discussion on teaching approaches to analysis: A new road proposal: Through the Serengeti, Africa.
- Next Steps: Resources, curriculum, maps, networking, online and face to face courses and opportunities.
- Evaluation: Final Q&A. Critical Incident Questionnaire. https://goo.gl/forms/NzqbdPzhkDnsUhRy1

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